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LUMIDUC ARCHITECTURE

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Present technology makes it possible to channel light in many rational ways. There are many examples of this, such as the capability of photographing certain internal organs of humans at a distance. Also we should mention the cameras used by the Americans during the Apollo flights. The light conductors are made in the form of tables, which consist of numerous filaments made of synthetic material. These direct the light no matter how the cables are bent.

The idea of transporting light is not a new one. The luminous fountains are based on the same principle. The water jets represent channels which contain the light. We should also mention illuminated stairs, which are made of glass or plexiglass. In these examples, one uses total reflection.

In contrast to this, when simple reflection is used, the channels are not filled with material. Instead they are crossed by internal reflecting walls. The cables or coverings cannot have too many sharp bends because the light losses will increase at small incidence angles.

Whatever can be done with artificial light, can also be done with solar light. This means it can be "channeled", "transported" and "distributed".

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* Numbers in the margin indicate pagination of original foreign text.

Let us consider the scale of a house and assume that a solar collector has been installed. (the form of which will be specified). It concentrates the solar rays in its lower part to the hollow channels. The internal walls of these channels reflect like mirrors, or they are made of fiberglass. In the first case, there is simple reflection and there is refraction in the second case. The light cannot leave the channel and will circulate just like water under pressure (but without any gravity effect) or like electricity. It will go through a selected place where it can be used. (Figure 1).

The sun faucets can be opened or closed by various systems of flaps or doors, at various locations just like water faucets. From this, a new concept of housing, architecture and urban design evolves.

Dad's architecture is dead (living room to the South, kitchen in the North, bedroom to the Southeast, etc.) The new solar house will have openings on the inside. The sun does not enter into the house but instead it enters from inside wherever one desires. If desired, the lawn on the North side of the house can be eliminated. (Figure 2).

In any liveable volume, the light can come from several places at the same time, from the ceiling, from the floor and from the walls. It is now that the revolution has begun! Our traditional concepts are rejected. Our regulations become outmoded and we can freely start to develop new plans. (Figure 3).

It should be noted that the old notions about orientation of the streets have always been the principal subject of discord. When oriented North-South or East-West, or even if oriented between these extremes, the streets always represented

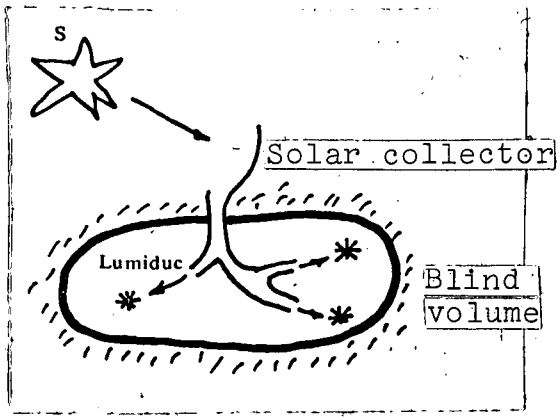


Figure 1.

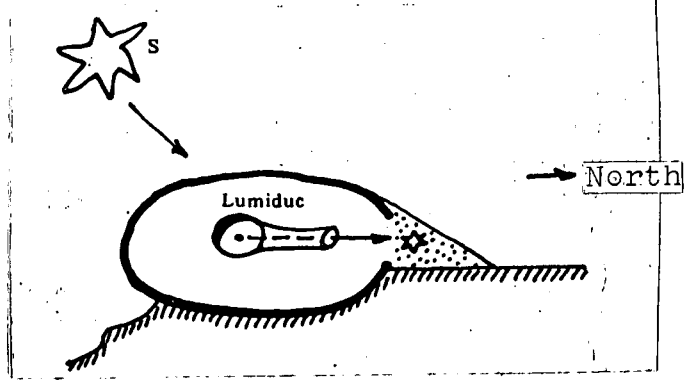


Figure 2.

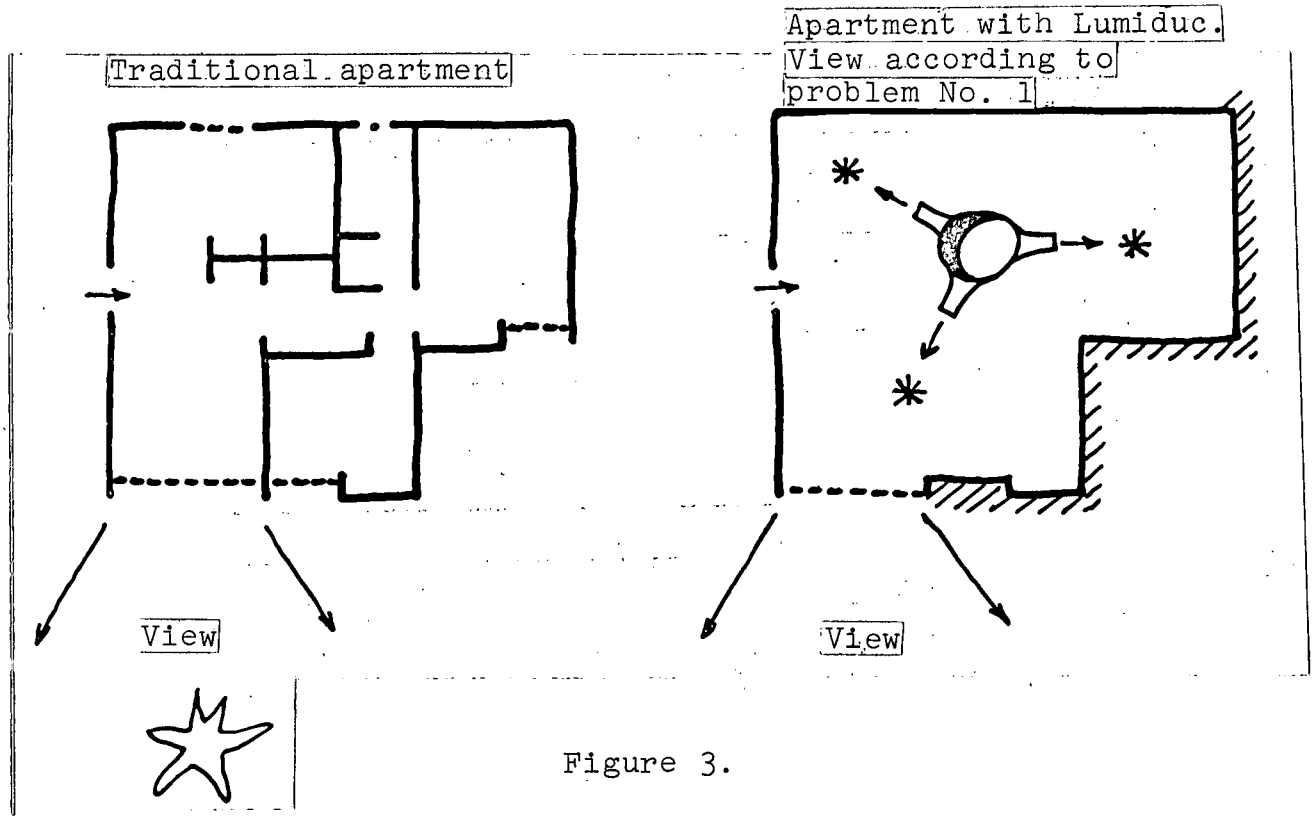


Figure 3.

the axes along which houses were constructed. According to tradition, the entrance and living room were located along the street side. This meant that only one out of every two houses had a good orientation. In passing, we should state that for the parceling of Pessac-Bordeaux, le Corbusier wanted to change things in order to specify the orientation and not follow the orientation of the streets. In spite of him, it was the inhabitants who fell back on the tradition mentioned above. From this we may state that the view is most important to the detriment of the orientation. Whatever the case may be, it is certain that humans need sunshine in any type of housing. Whether the sun comes from the left or the right is not important in the final analysis.

Let us now consider an agglomeration. If it is a large /76
one, we need more volumes which require only a small amount of light or which needs no light at all.

The specialist in underground architecture, M. Utudjian who is the founder of Gecus, has in his designs located all the areas which do not require light underground. Among these areas, we have the following: movie houses, theaters, hangars and all supply rooms, garages, certain stores (for example the Omania at Athens, the large commercial center CAP 2000, close to Nice, the commercial center of the central railway station at Tokyo, which is completely underground and air-conditioned. It extends over several kilometers. All large stores in Paris, where the windows are usually filled with displays, and are often closed off so as to provide more space, etc.) It should be noted that in our cities, 14 percent of the surface is occupied by streets, interchanges and squares. Also, construction is proceeding downward, as well as upwards, and underground construction is much more costly. (See Figure 4).

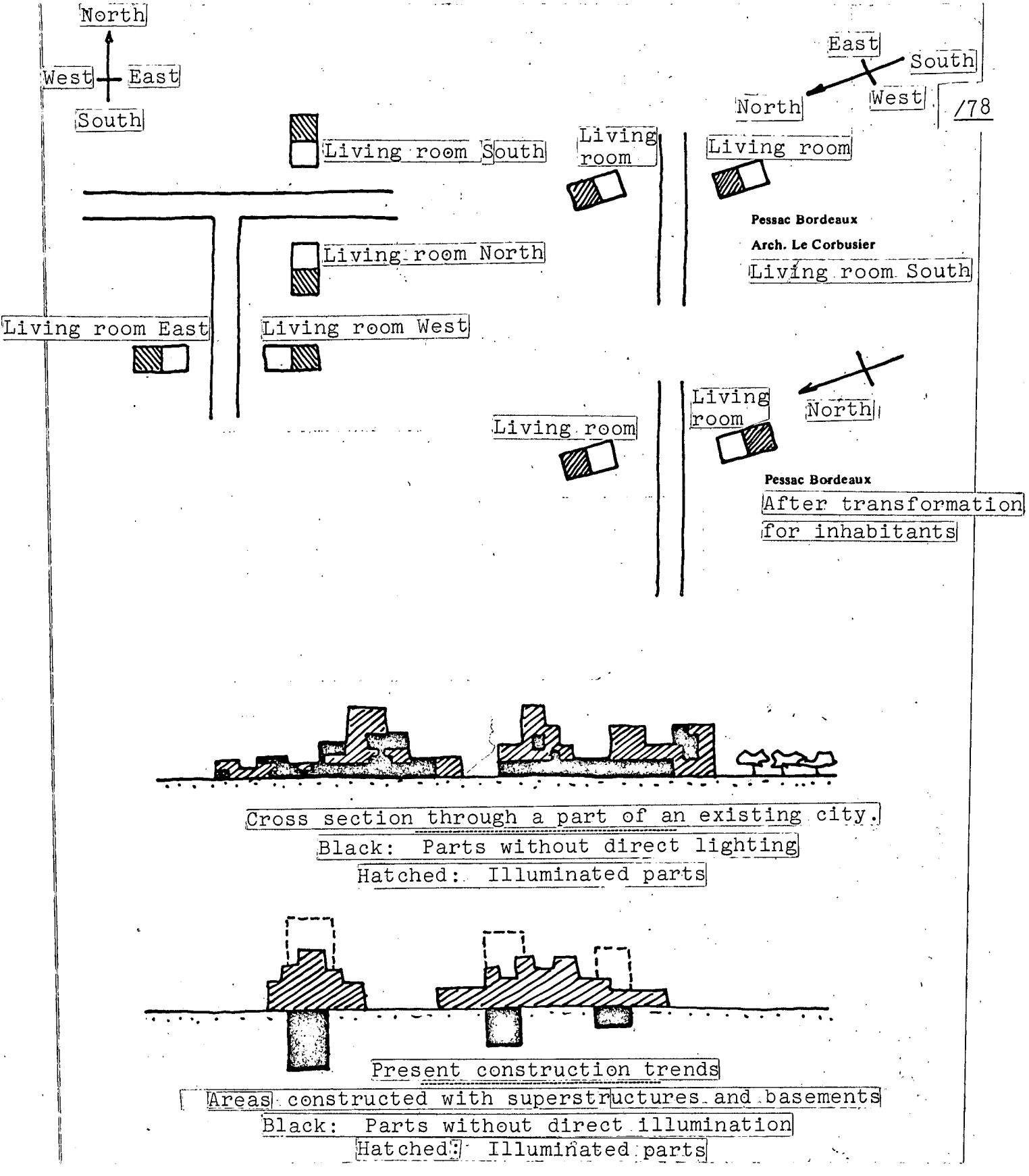

North
West
East
South
Living room South
Living room North
Living room East
Living room West
Living room
Living room
East
South
North
West
/78
Pessac Bordeaux
Arch. Le Corbusier
Living room South
Living room
Living room
North
Pessac Bordeaux
After transformation
for inhabitants
Cross section through a part of an existing city.
Black: Parts without direct lighting
Hatched: Illuminated parts
Present construction trends
Areas constructed with superstructures and basements
Black: Parts without direct illumination
Hatched: Illuminated parts

Figure 4.

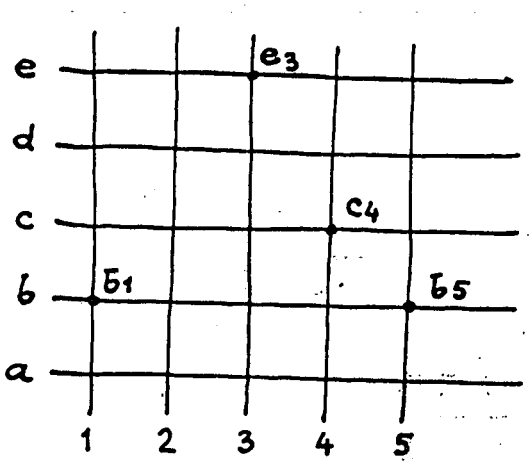
How can we organize a new agglomeration. We are interested in synthesis and not analysis.

Let us first consider all areas which do not have to be illuminated. Let us surround these areas with a circulation system at many levels. It is based on a checkerboard principle (Figure 5). (It is not important that this checkerboard be formed like the Vassarely table, the principle remains the same.) These areas constitute the interior of a pyramid (Figure 6). The external surface can be made up of apartments. This pyramid is assumed to have four faces, which are lighted differently by the sun. This is the reason why such architecture is difficult to accept today because of our urban conventions. In our system today, everything is oriented towards the sun (Figure 8).

Our pyramid has a number of "Lumiducs" passing through it (Figure 9). The badly situated apartments can receive their sunlight from any side. The sunlight can come from the interior. Therefore, we have satisfied the condition that the apartments should have a direct view and, if necessary, they will also have sunlight, but not necessarily from the South. The Lumiducs obviously will only use direct sunlight and will have only a very small effect in the case of overcast conditions. In this case it is necessary to use artificial lighting.

Therefore, it seems logical in a first phase of a study or project to install them where the sun appears often, that is, the Mediterranean area. After that, improvements or new inventions will make it possible to use them in other countries.

Let us first consider the apartment: we can see that only a few rooms must be located along the outside. Halls, bathrooms,



Traffic system

Figure 5.

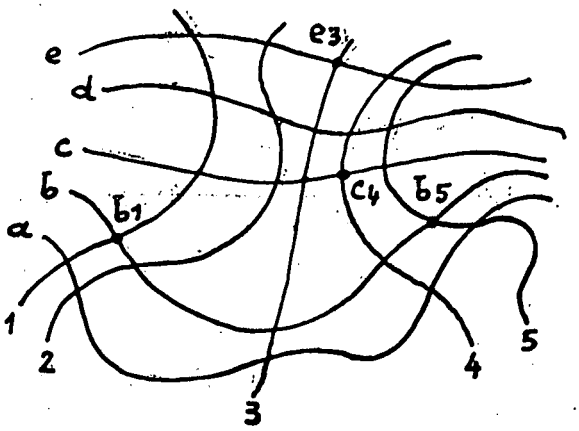


Figure 6.

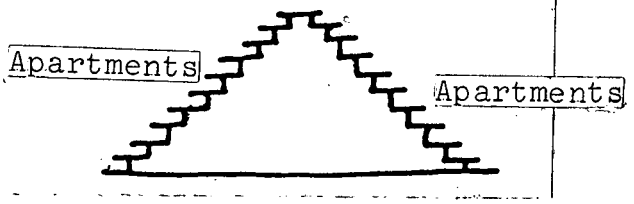


Figure 7.

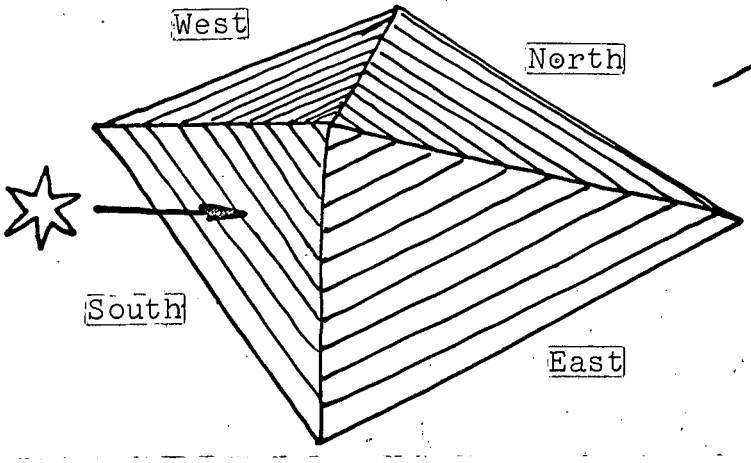


Figure 8.

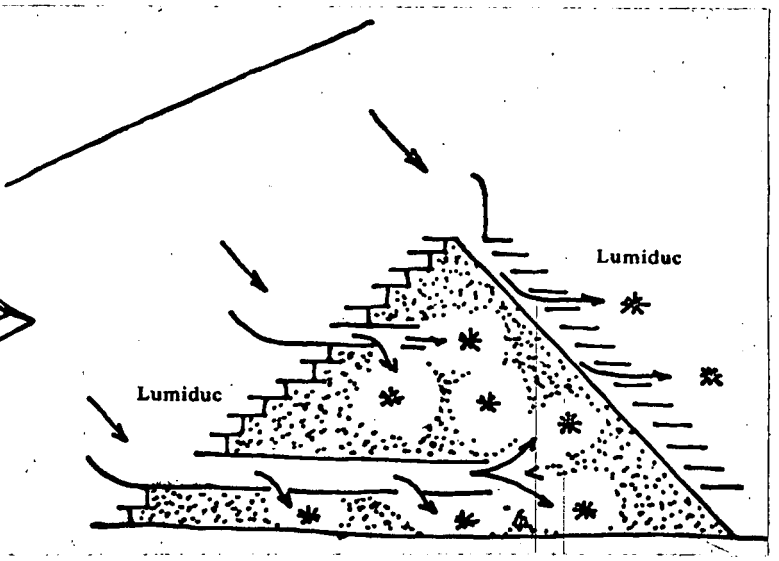


Figure 9.

kitchens and bedrooms, (only used at night), can be located inside and could also be illuminated using Lumiducs.

Let us now deform our pyramid as though it were a pile of clay. We then form an artificial hill, and the level contours which are not equidistant in a plane view, will make up the exterior contours of each floor of apartments. The interior of the hill will contain everything that does not require direct lighting (Figure 10).

Large outside cacti and public gardens will also be located outside. Part of the gardens can be located inside (Figure 11).

The hill will have the appearance of rice fields, (sawas) as are found in China or Indonesia, as well as the appearance of the suspended gardens of Babylonia. At the foot of the hill, there are the entry points of the transportation wings for cars and trucks. Interior ramps give access to all levels and go to the working areas and apartments (Figure 12).

As M. Touchais states, architecture is at the present time /81
a pollutant because all built-over areas result in a surface without vegetation.

In villages or low density cities, this is not very important. For present and future concentrations, however, this will be a plague because the natural biological equillibrium is disrupted (oxygen and CO_2 production). It may be possible to make better use of the built-over areas and better use of the sun, using this new technology.

As we have seen, from now on, the sun can be considered a commodity. It is no longer necessary to locate living quarters

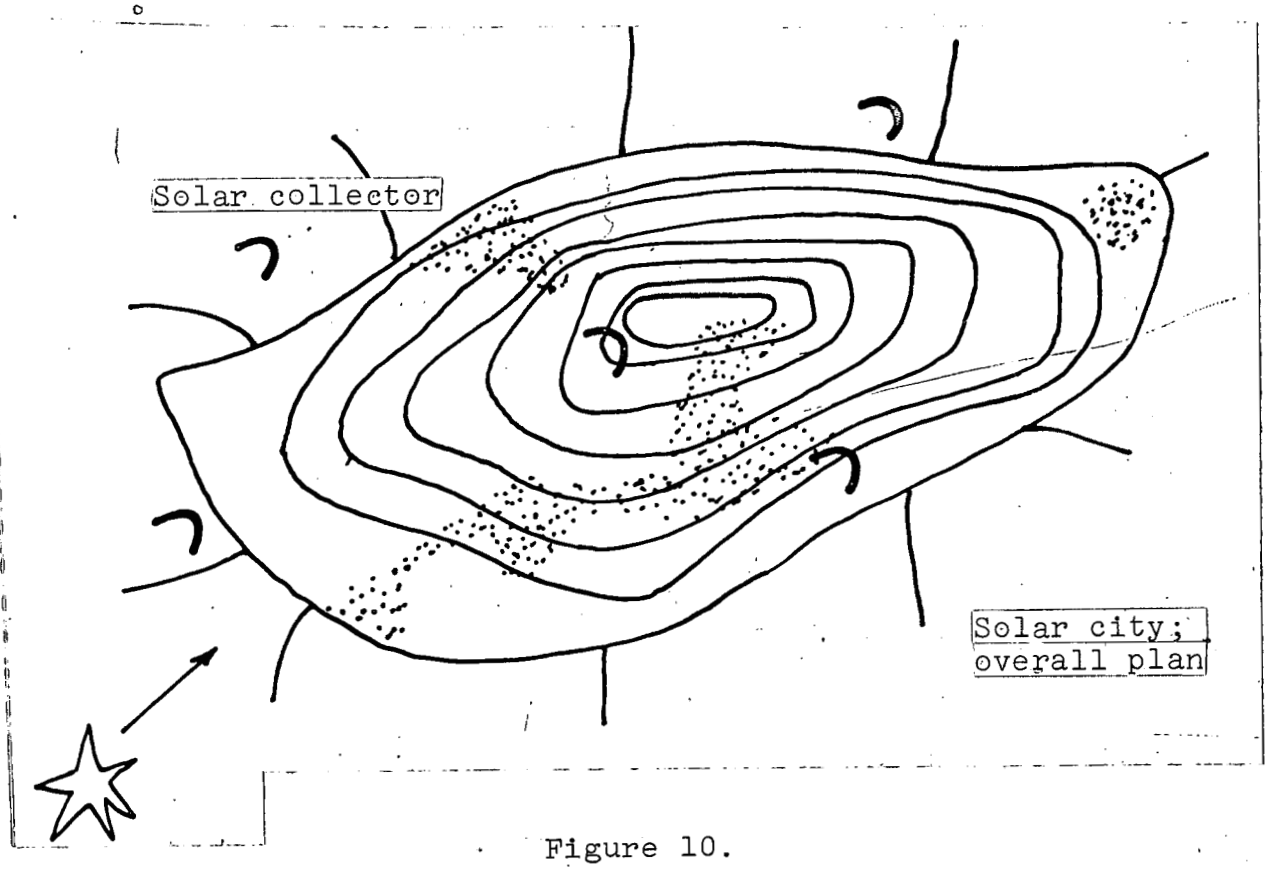


Figure 10.

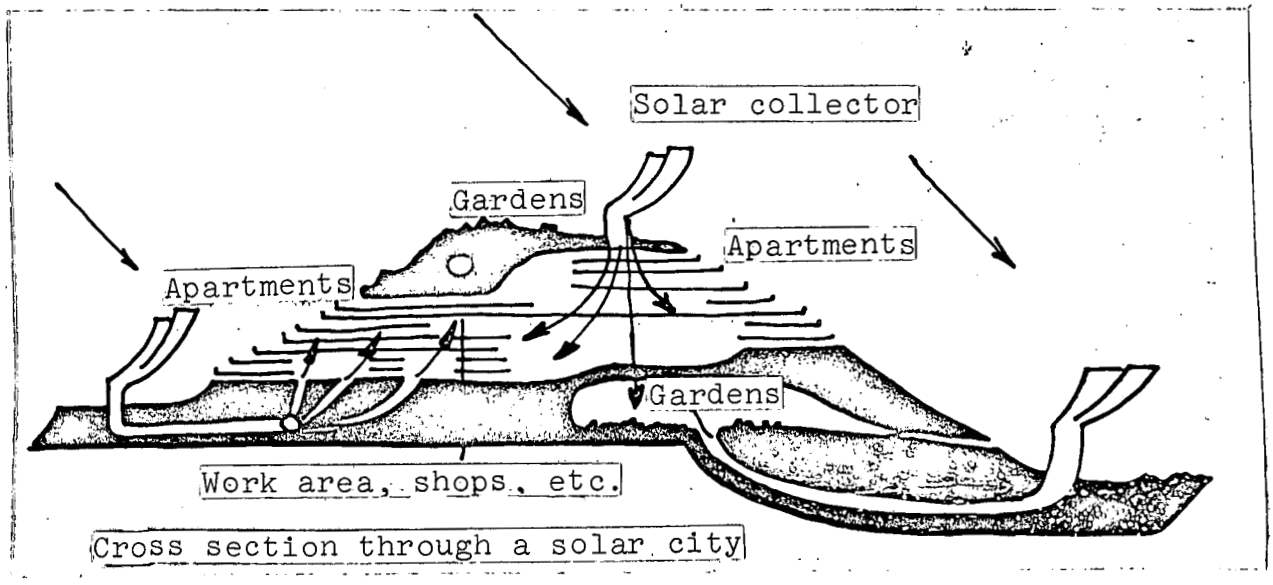


Figure 11.

with specific orientations. Residential quarters can vary with regard to density and inclination.

It remains to be determined how the size of the Lumiducs can be reduced (1-50?) by concentrating the light (for water the number of channels is reduced by increasing the pressure for the same yield)? Also we should determine whether it will be possible to finally store solar light in one form or another. However, this would disrupt our 24-hour rhythm, which is now the present basis of urban life.

For the first time the sun can penetrate into the slums, subways, inside apartments, etc. This idea must be used by the builders of this new architectural concept. We hope this will happen without new regulations, which would modify or forbid the use of these possibilities.

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